Ecological Environmental Indicator

Use at RCRA Corrective Action Facilities and Voluntary Cleanup Sites

Kansas City, MO, May 20, 2004

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Overview

- Historical use of indicators (RCRA)
- Relevance/Context for ecological indicators
- Examples: Corrective Action, Voluntary Program
- Getting started

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Historical Use of Indicators

- Human Exposures Controlled (CA725)
- Groundwater Migration Controlled (CA750)

***Measures of <u>exposure, not condition</u>**

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Relevance/Context

- Tracks CA progress at (primarily) high priority facilities
- Recognizes the ERA process as a tool to establish protective ecological conditions
- Integral to meeting GPRA goals for 2008 for final remedy complete

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Relevance/Context

- Quantifying cleanup progress is an indirect measure of ecological condition
- The ERA will identify those ecological components selected for evaluation/monitoring
- The condition of these (Assessment) endpoints is the direct measure of environmental condition

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Examples

- RCRA Corrective Action Facility

  DOD Facility
- Voluntary Remediation Program (Wyoming)

  http://deq.state.wy.us/

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Implementation

- Obtain consensus on the ecological risk management goal for the facility/site
- Use and fully document the risk assessment process including decision criteria
- Incorporate environmental monitoring, to the extent necessary based on ecologically relevant time frames

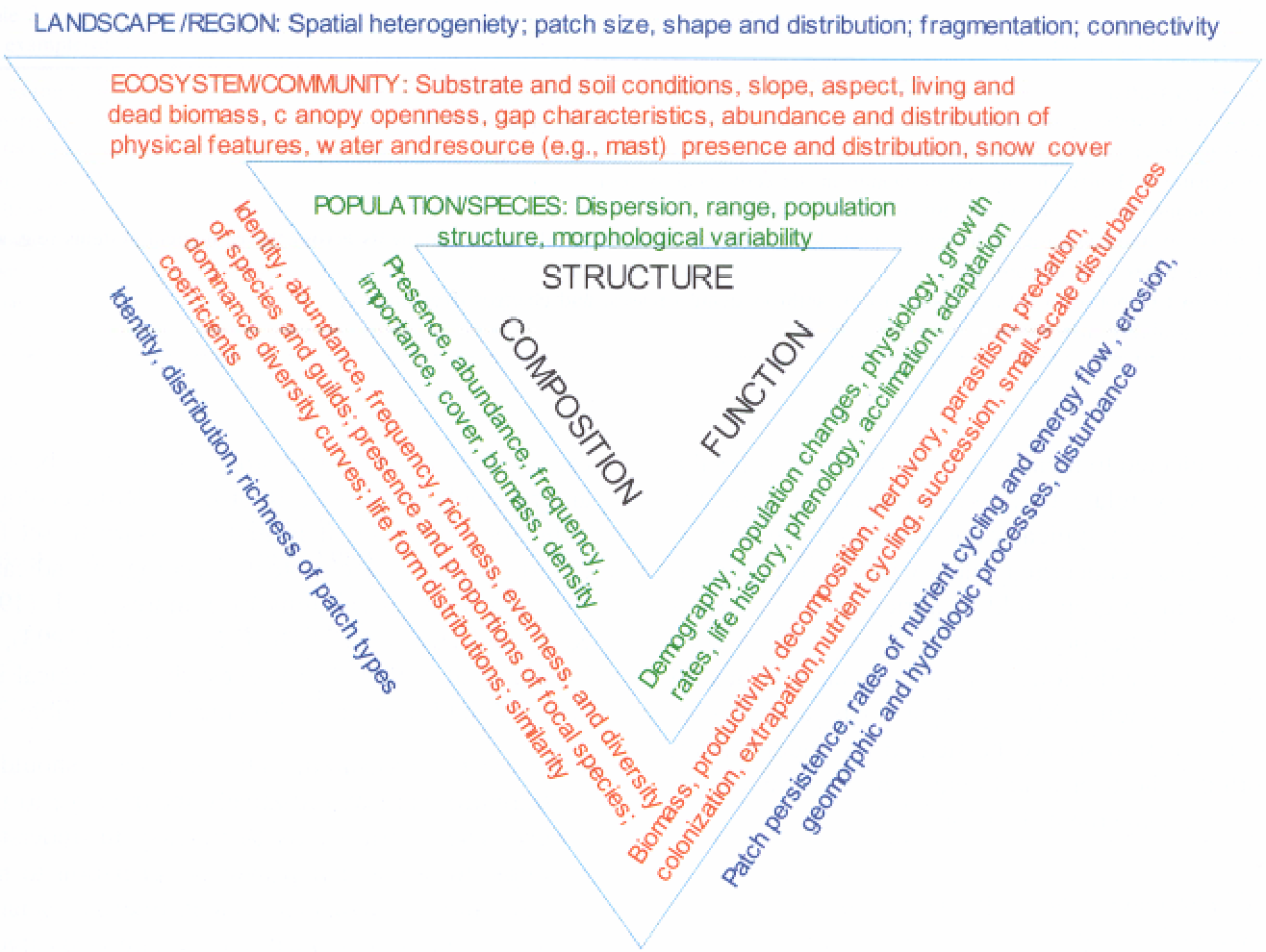

Fig. 1. The ecological hierarchy: a triangular representation of the key characteristics of composition, structure and function (derived from Franklin, 1988 and Noss, 1990).

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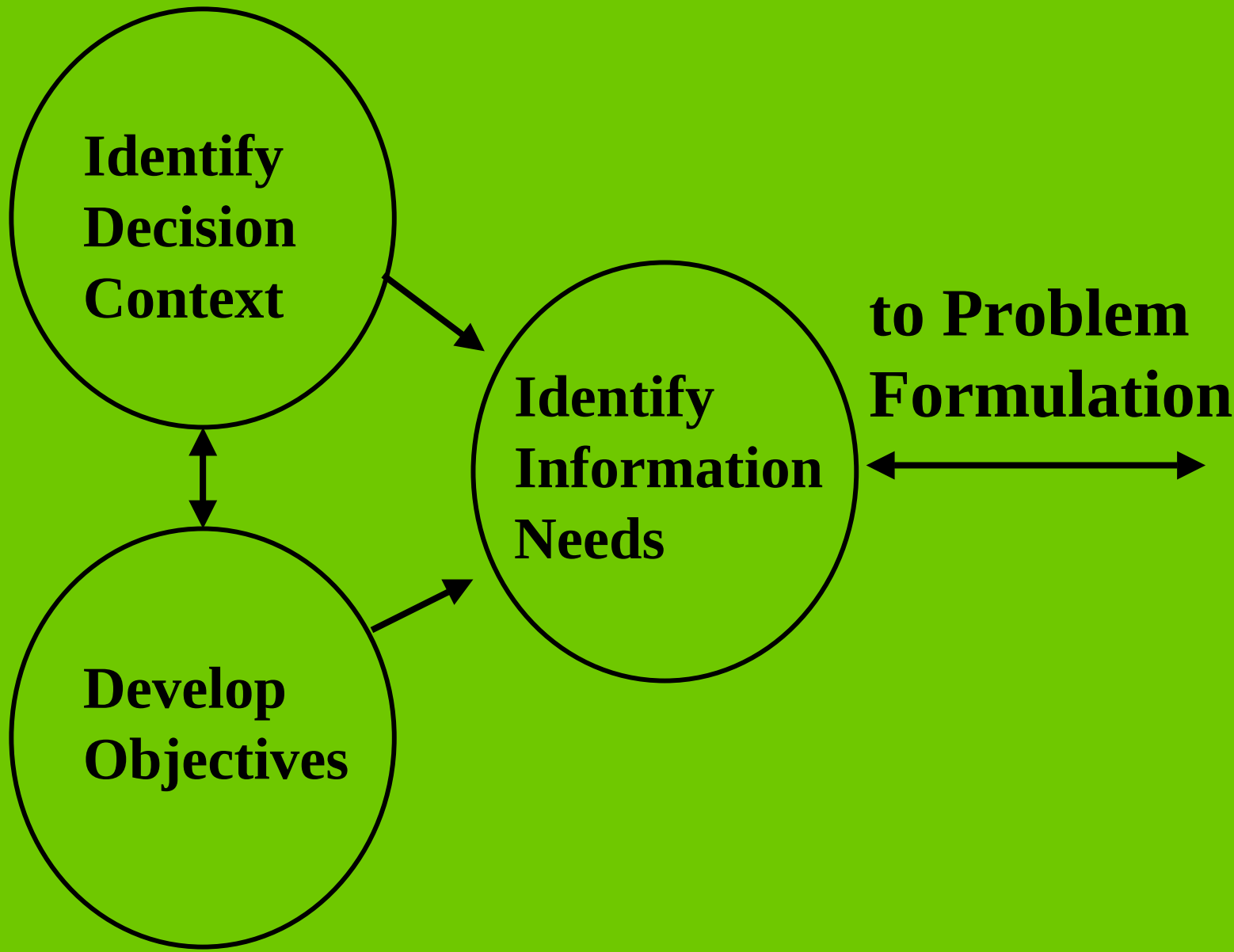
Asking the Right Questions

- Questions Risk Managers should ask
- Questions Risk Assessors should ask

Risk Assessment Forum

-- Guidelines for Ecological Risk Assessment


Identify
Decision
Context
Develop
Objectives
Identify
Information
Needs
to Problem
Formulation

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Minimal requirements for ERAs

- Planning/Problem Formulation
  - Management goals/objectives
  - Conceptual site model
  - Assessment endpoints
  - Analysis plan

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Minimal requirements for ERAs

- Analysis
  - Exposure characterization
  - Effects characterization

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Minimal requirements for ERAs

- Risk Characterization
  - Risk estimate
  - Risk description
  - Communication plan

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Generic Assessment Endpoints

- "Assessment Population"

Definition: *A group of conspecific organisms occupying a defined area that have been selected to serve as an assessment endpoint entity for an ecological risk assessment.*

-- Risk Assessment Forum, GEAE Guidance

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Generic Assessment Endpoints

- "Assessment Community or Assemblage"

Definition: *A group of organisms occupying a defined area that have been selected to serve as an assessment endpoint entity for an ecological risk assessment. The group may include all organisms in the area in a taxon, or in certain samples.*

-- Risk Assessment Forum, GEAE Guidance

Table 2.1 **Generic Ecological Assessment Endpoints**

Entity	**Attribute**
Organisms (in an assessment population or community)	kills (mass mortality, conspicuous mortality)
Organisms (in an assessment population or community)	gross anomalies
Organisms (in an assessment population or community)	survival, fecundity, growth
Organisms (in an assessment population or community) Particularly threatened and endangered species, marine mammals, bald and golden eagles, and migratory birds.	
Organisms (in an assessment population or community)	avoidance
Assessment population	extirpation
Assessment population	abundance
Assessment population	production (includes fecundity, survivorship and growth)
Assessment community or assemblage	species richness
Assessment community or assemblage	abundance
Plant assemblage	production
Wetlands	area or function
Coral Reefs	area or species richness
Critical habitat for threatened or endangered species	area or quality
Endangered/Rare ecosystem types	area of the type (direct destruction or change to another type)
Aquatic ecosystems	physical structure
Special places	ecological properties that make them special and legally protected properties

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Common implementation pitfalls in ERA

- Confusing RCRA requirement to define nature and extent with documenting risk
- Working the process backward – defining risk management goals at the end of the ERA
- Loss/replacement of project staff (e.g., project mgrs., risk assessors, BTAG members)

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Common implementation pitfalls in ERA

- "linguistic imprecision" – concepts and ideas expressed using inconsistent terminology
- Variance from accepted ERA guidance/policy
- Lack of understanding of ERA process by co-regulators

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wharton.steve@epa.gov